

Remarks

Claims 1-26, 31-38, 43-45, 60-67, and 72 were pending in the subject application. Submitted herewith is a Request for Continued Examination (RCE) under 37 CFR §1.114 for the subject application. By this Amendment, claims 1, 2, 5, 7, 11, 15, 31, 43, and 72 have been amended, claims 3, 4, 8, 10, and 14 have been cancelled, and new claims 87-96 have been added. Support for the new claims and amendments can be found throughout the subject specification and in the claims as originally filed. Entry and consideration of the amendments presented herein is respectfully requested. Claims 5, 6, 13, 15, 16, 20-26, and 60-67 remain pending but withdrawn from consideration. Accordingly, claims 1, 2, 7, 9, 11, 12, 17-19, 31-38, 43-45, 72, and 87-96 are currently before the Examiner for consideration. Favorable consideration of the pending claims is respectfully requested.

Applicants acknowledge that claims 4-6, 13-16, 20-26, and 60-67 have been withdrawn from further consideration as being drawn to a non-elected invention. However, Applicants wish to reserve the right to request rejoinder of the non-elected method claims upon an indication of an allowable compound claim in accordance with MPEP §821.04.

Applicants gratefully acknowledge the Examiner's withdrawal of the objection of claims 43 and 72, certain aspects of the rejection under 35 USC §112, second paragraph, and the rejection under 35 USC §102(b) over the Ballicora *et al.* reference.

Claims 1-3, 7-12, 17-19, 31-38, 43-45, and 72 remain rejected under 35 USC §112, second paragraph, as indefinite. The Examiner asserts that the language "when compared to a wild type AGP enzyme" is indefinite because different wild type AGP enzymes have different heat stabilities. Applicants respectfully assert that the claim language is not indefinite. However, by this Amendment, Applicants have amended the claims to recite that the mutant enzyme of the invention exhibits increased heat stability when compared to the wild type form of the same plant AGP enzyme. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §112, second paragraph, is respectfully requested.

Claims 1-3, 7, 9, 17-19, 31-38, 43-45, and 72 remain rejected under 35 USC §112, first paragraph, as non-enabled and as lacking written description by the subject specification. The Examiner asserts that the specification does not enable or provide adequate written description for any mutant AGP enzymes other than those that have a cysteine substituted for tyrosine at position 36 of the maize small subunit. The Examiner also asserts that the specification does not enable or provide written description for mutant AGP enzymes with increased heat stability other than maize wild type AGP. Applicants respectfully assert that the subject specification does enable and provide written description for the claimed invention. As Applicants noted in their previous Amendment, sequences of numerous plant AGP small subunits were known in the art at the time of the invention. Corresponding mutations could be made in other plant AGP small subunits by an ordinarily skilled artisan having the benefit of the teachings of the subject specification. There is no requirement that a specification teach that which is well known in the art. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 231 USPQ 81 (Fed. Cir. 1986) citing *Lindemann Maschinenfabrik v. American Hoist and Derrick*, 221 USPQ 481 (Fed. Cir. 1984), (“... a patent need not teach, and preferably omits, what is well known in the art.”). Applicants respectfully assert that it is not necessary to provide sequences of mutant AGP small subunits other than maize in order to satisfy the enablement and written description requirements of 35 USC §112.

However, by this Amendment, and in a sincere effort to advance prosecution of the subject application to allowance, Applicants have amended the claims to recite that the mutation is located at the position corresponding to the tyrosine at position 36 of wild type maize endosperm small subunit amino acid sequence and that a cysteine replaces the wild type amino acid. Applicants again submit that the amino acid sequence of the small subunit of AGP was known in the art at the time of the present invention for numerous different plant species. Applicants further submit that an ordinarily skilled artisan, having the benefit of the teachings of the subject specification, would be able to readily identify corresponding amino acids in the small subunit positions for heat labile plants other than maize and make the cysteine substitution. A person of ordinary skill in the art, having the benefit of the teachings of the subject specification and without resorting to undue experimentation, can also readily prepare mutant plant AGP small subunits and determine whether the mutant small subunit provides for increased heat stability of a plant AGP enzyme. Applicants respectfully submit

that while some experimentation may be necessary, it is not controlling on the issue of undue experimentation. *Ex parte Jackson*, 217 USPQ 804, 807 (Bd. Pat. App. & Int. 1982) (“The test [for undue experimentation] is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine . . .”) (emphasis added). Thus, Applicants respectfully submit that the subject specification provides sufficient written description and fully enables the claimed invention. Accordingly, reconsideration and withdrawal of the rejections under 35 USC §112, first paragraph, is respectfully requested.

Claims 1-3, 7-12, 17-19, 31-38, 43-45, and 72 are rejected under 35 USC §103(a) as obvious over Greene *et al.* (1998) in view of Giroux (U.S. Published Application No. 2003/0150027) and further in view of Ballicora *et al.* (1999). The Examiner maintains that it would have been obvious and within the scope of one of ordinary skill in the art to make mutations in the maize AGP small subunit to introduce cysteine residues in the N-terminus with the goal of providing the necessary SH group for forming di-sulfide bonds to increase the heat stability of the enzyme. Applicants respectfully traverse this ground of rejection.

Applicants respectfully maintain that the cited references, whether taken alone or in combination, do not teach or suggest the claimed invention. As the Examiner acknowledges, the Greene *et al.* and Giroux publications are directed to mutations in the large subunit of plant AGP and do not teach or suggest the claimed invention wherein the mutations are present in the N-terminus of the small subunit of a plant AGP. The fact that some amino acid variants in the large subunit of AGPase resulted in increased heat stability does not teach or suggest or imply, under any circumstances, that amino acid mutations could be created in the small subunit that would result in increased heat stability. In addition, the Ballicora *et al.* reference does not teach or suggest a mutant AGP small subunit of a plant having a heat labile wild type AGP enzyme wherein the mutant small subunit confers increased heat stability on a plant AGP enzyme. The Ballicora *et al.* reference is only concerned with the impact of a mutation in potato tuber AGP, which is a heat stable AGP enzyme. Applicants respectfully maintain that a person of ordinary skill in the art would not have considered the combined teachings of the cited references and would not have found it obvious to make mutations in the N-terminus region of a heat labile plant AGP small subunit that provide for increased heat stability of the plant AGP enzyme, nor would the ordinarily skilled artisan have had a

reasonable expectation of success. It appears that the Examiner is relying on hindsight reconstruction of the art to arrive at the claimed invention. However, hindsight reconstruction of the prior art to arrive at Applicant's invention is not permissible. *In re Sponnoble*, 160 USPQ 237, 243 (CCPA 1969).

In addition, as Applicants noted previously herein, the claims have been amended to recite that the claimed mutation is located at the position corresponding to the tyrosine at position 36 of wild type maize endosperm small subunit sequence. It is not predictable from the combined teachings of the Greene *et al.*, Giroux, and Ballicora *et al.* references that a mutation wherein a cysteine amino acid replaces the amino acid corresponding to tyrosine at position 36 of wild type maize endosperm sequence would provide for increased heat stability of a plant AGP enzyme. Thus, the cited references do not teach or suggest the claimed invention, and a person of ordinary skill in the art at the time of the present invention would not have had a reasonable expectation of success in producing mutant AGP small subunits of a wild type, heat labile plant AGP enzyme wherein plant AGP enzyme comprising the mutant small subunit exhibits increased heat stability.

Three basic criteria must be met in order to establish a *prima facie* case of obviousness. *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007). First, there must be an apparent reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings of references. *See KSR International Co. v. Teleflex, Inc.*, 127 S. Ct. at 1741. In addition, there must be a reasonable expectation of success. *Id.* Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 985 (CCPA 1974). Applicants respectfully assert that there is no apparent reason to modify or combine the cited references, and there is no reasonable expectation of success, nor are all of the claim limitations taught or suggested. Thus, the claimed invention is not obvious over the cited references. Accordingly, reconsideration and withdrawal of the rejection under 35 USC §103(a) is respectfully requested.

It should be understood that the amendments presented herein have been made solely to expedite prosecution of the subject application to completion and should not be construed as an indication of Applicants' agreement with or acquiescence in the Examiner's position.

In view of the foregoing remarks and amendments to the claims, Applicants believe that the currently pending claims are in condition for allowance, and such action is respectfully requested.

The Commissioner is hereby authorized to charge any fees under 37 CFR §§1.16 or 1.17 as required by this paper to Deposit Account 19-0065.

Applicants invite the Examiner to call the undersigned if clarification is needed on any of this response, or if the Examiner believes a telephonic interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,



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Attachments: Request for Continued Examination